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Descriptors- Auditory Discrimination, Auditory Tests, Behavior Rating Scales, \*Child Development, Cognitive Tests, \*Indexes (Locators), Intelligence Tests, Interviews, Language Tests, Maturity Tests, \*Measurement Instruments, Perception Tests, Performance Tests, Personality Tests, \*Preschool Tests, Reading Tests, Test Construction, \*Tests, Test Selection, Verbal Tests, Vision Tests

The tests described in this index are used by the Institute for Developmental Studies in its principal areas of research and do not include recently developed tests. The research at the Institute is concerned with (1) the relationship of differing environments to language development, (2) classroom communication between teachers and children of various socioeconomic levels, (3) the effect of psychopharmacological agents on children's learning, and (4) relationships among sensory modality preference and efficiency, lateral dominance, and psychological development and functioning. Described, too, are interviews, questionnaires, a variety of tools used to study perception and cognition, and standardized instruments for assessing intelligence, academic achievement, and personality factors. This index provides a brief description of measurement and evaluation techniques in the form of a summary of the purposes for which each test was devised, the method of administration, the way it has been used to date, and plans for its future use. (DD)

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**Index and Description  
of Tests**

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## Preface

The Institute for Developmental Studies is an interdisciplinary unit of the Department of Psychiatry of the New York Medical College. Since its inception in 1958, the Institute has been carrying on a series of parallel programs of research, training, curriculum development, and demonstration, emphasizing the influence of the environment on developmental and learning processes in children. Special stress has been placed on language systems, sensory and motor processes, and the relationship among social and familial backgrounds with school performances and psychological growth.

Studies of language interaction and acquisition in the home and in the school, comparisons of developmental differences in language across social class lines in various ethnic populations, and across sex lines in larger samples have been carried out. We have also correlated language performance with academic achievement, problem-solving, concept formation, intelligence, auditory discrimination, reading achievement, and self-concept.

Specifically, the principle areas of research with which the Institute is concerned include: (1) the relationship of differing environments to language development; (2) classroom communication between teachers and children of various socioeconomic strata; (3) the effects of various psychopharmacological agents on children's learning; (4) the relationships among sensory modality both preference and efficiency, lateral dominance, and psychological development and

functioning. The Institute is also engaged in a large-scale investigation of the retraining potential of brain-damaged children, both to evaluate the trainability of brain-damaged children and to design techniques for this purpose. Implicit in the research design is the assumption that many more brain-damaged children could profit from retraining than are now able to, if the learning situation could be adapted directly to their particular difficulties, that is, their specific modalities of impairment.

Concurrent with the Institute's research program is the application of the results of that research. Application includes the development of experimental educational techniques, verbal and cultural enrichment programs for children in preschool and the lower grades, and the training of teachers to work with culturally deprived children. The purpose is to introduce compensatory intervention programs early in the child's life, before he has had contact with the school.

These projects require the use of many techniques for studying verbal behavior, the development of interviews and questionnaires, and a variety of tools with which to study perception and cognition. The Institute has devised many tests and has adapted others to derive adequate evaluation of the abilities, learning potential, and response characteristics of children. In addition, certain standardized instruments for assessing intelligence, particular aspects of academic achievement, or personality factors have been incorporated into the regular Institute test batteries.

This index provides a brief description of these measurement and evaluation techniques in the form of a summary of the purposes for which each test was devised or adapted, the mode of administration, and the way in which it has been used to date, as well as any plans for its future use. A number of these tests has been used in several of the Institute's studies.

This listing does not include certain new tests in the earliest stages of development, nor does it include the many standardized tests and evaluation techniques that the Institute has on hand for reference, for possible inclusion in future Institute batteries, or for occasional use with individual children under special circumstances. An up-to-date card catalog of these tests is maintained in the Institute library, and a separate listing has been made available to the staff.

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## I. INTERVIEW AND QUESTIONNAIRE PROCEDURES.

### A. Home Interview Technique.

The Parental Home Interview currently being used at the Institute has evolved from previous investigations using interview procedures and questionnaires sent to parents by mail. It is designed to identify and measure salient aspects of the physical, social, and cultural environments that foster or limit the development of cognitive skills and intellectual abilities of children. In its present form, the interview is largely a structured technique, though it does contain a number of questions providing for open-ended responses from parents. The interview is administered to parents by trained interviewers and qualified social workers. It yields information on the following partial lists of variables, which we have found to be significantly related to children's ability to learn.

1. Educational level of mother and father.
2. Occupation of workers in the family.
3. Size of family.
4. Number of rooms in the home.
5. Soundness or dilapidation of dwelling units.
6. Presence or absence of father in home.

In addition, a number of indices have been developed that characterize the nature of parent-child relationships, including:

1. Parent-child verbal interaction (nature of verbal interactions and extent), as reported by parents in response to fourteen separate questions.

2. Parents' aspirations for child's schooling and occupation.
3. Parental encouragement of child's intellectual activities and interest.
4. Dependence-independence fostered by the parents.

The information from this test is the basis for the Socio-economic Status Index (SES Index). See page .

Study:

1. Relationship of Language Development to Social Class and Intelligence.

- a. Sample: 292 Negro and white male and female children, first and fifth grades in 12 schools, SES I, II and III.
- b. Results: A number of systematic differences in the social environments of children were found to be associated with social class and race. A factor analysis of approximately 50 variables identified two predominant factors: the child's family as determined by number of people in the home and housing conditions, and parental aspirations for the child at school and in his future vocation. This latter factor included such variables as the parents' estimation of the child's chances for success in school as opposed to their wishes for the child's success, and the parent's expectation of the child's occupational achievement as opposed to their wishes for the child's future occupation.

2. An Evaluation of the Effectiveness of an Enriched Curriculum in Overcoming the Consequences of Enrichment deprivation.

a. Sample: All experimental and control children of the Institute's enrichment program are rated on this scale.

b. Results: The data are being analyzed.

B. Screening Interview with the Child.

This initial screening interview with the child (in addition to the parental interview) yields information on which to assess selected aspects of the child's general development. The primary purpose is to discover whether there are gross developmental anomalies, such as problems with motor skills, delayed speech, or overt signs of disturbed emotional behavior. This screening procedure is presently being revised to include evaluation of the child's gross motor functioning, visual acuity and a test for color blindness.

Study:

1. Relationship of Language Development to Social Class And Intelligence.

a. Sample: 292 Negro and white male and female children, first and fifth grades in 12 schools, SES I, II and III.

b. Results: The screening interview with the child is in the process of being revised, and validation studies will be carried out.

2. An Evaluation of the Effectiveness of an Enrichment Curriculum in Overcoming the Consequences of Environmental Deprivation.

a. Sample: All experimental and control children of the Institute's enrichment program are rated on this scale.

b. Results: The screening interview with the child is in the process of being revised and validation studies will be carried out.

C. Index of Socioeconomic Status.

The Institute's Index of Socioeconomic Status was devised to classify children according to a socioeconomic continuum that would be appropriate for white and Negro children. The purpose was to establish an objective and quantifiable index.

The scale was initially based on data derived from a mail questionnaire sent to the parents' home, and from a home interview with those who did not respond to the questionnaire. Reliability of the data on which the index was based was, in part, determined by interviews with the children.

Initially three variables were chosen:

1. Occupation of the main support of the family, evaluated by the Empey Scale of Occupational Prestige.
2. Education of the main support.
3. Person-to-room ratio, yielding some measure of standard of living.

The Wilkes procedure was used for assigning weights on the basis of the intercorrelations between the variables when no outside criterion was available. Analysis indicated that the person-to-room ratio was a poor contributor and this variable was therefore eliminated. The Index currently being used consists of two components: (1) the educational level of the main wage earner in the family; and (2) a prestige rating of his occupation.

In determining the social class rating for a household, a score of one (lowest) to eight (highest) is assigned to the level of educational attainment of the main wage earner; a score of one (lowest) to ten (highest) is assigned to the prestige rating



of his occupation. A social class score represents the sum of these variables, equally weighted. The combined score is then assigned to one of three social class levels, I being the lowest and III the highest, based on the trichotomization of the original distribution.

The correlation between the educational level of the main breadwinner and the prestige rating of his occupation suggested that no excessive redundancy exists between the two components of the social index. It therefore appears that the measurement of social class (in terms of the social class index) involves an assessment of two relatively different dimensions, which are tapping one underlying continuum. In general, a chi square analysis indicated that there were very few instances of significant interaction of race, social class, and a given dependent variable. This finding suggests that the same social class index may be used in classifying both Negro and white children.

The validity of the index was confirmed by the following relationships which were revealed by a chi square analysis:

- a. Degree of crowdedness in the household was greater in the lower class than in the middle class.
- b. Degree of dilapidation of neighborhoods surrounding households of the lower class was greater than the middle class.
- c. The parental aspirations for the child's first job were greater for the middle class than the lower class.



- d. Amount of education desired for the child's first job was greater for the middle class than the lower class.
- e. Child's aspirational level was greater for the middle class than the lower class.
- f. Parental perception of own improvement was greater for the middle class than the lower class.
- g. Actual improvement in job mobility of main support of the household was better for the middle than the lower class.
- h. Absence of father from the home was more frequent in the lower class than the middle class.
- i. Father as source of main support was more frequent in the middle than the lower class.
- j. Nutritional adequacy (operationally defined) of child's breakfast was better in the middle than lower class.
- k. Total cultural (operational definition) activities by child over weekend was greater in the middle than lower class.
- l. Total number of people in the home was greater in the lower than middle class.
- m. Person-to-room ratio was greater in the lower than middle class.
- n. Kindergarten attendance was greater for the middle than lower class.

Study

1. Relationship of Language Development to Social Class and Intelligence.

a. Sample: 292 Negro and white households were classified according to the above-mentioned class levels. The sample was so selected that there were relatively equal proportions of Negro and white households distributed among the three social class levels.

b. Results: Generally, the children from lower SES backgrounds tend to show significantly poorer verbal performance than do children from higher SES backgrounds. In some cases on specific abilities, such as verbal fluency, there were no significant differences between SES groupings, whereas in the majority of verbal abilities the differences were marked.

2. An Evaluation of the Effectiveness of an Enriched Curriculum in Overcoming the Consequences of Environmental Deprivation.

a. Sample: All experimental and control children of the Institute's enrichment program are rated on this scale.

D. Deprivation Index.

In current professional literature, there is frequent reference to the "deprived child." While it is clear that people in the lowest socioeconomic strata experience many types of deprivation, and that these conditions are associated with poor academic achievement, it is not at all certain which kinds of deprivation, and in what amounts, are related to what kinds of learning disabilities and what aspects of scholastic retardation. Further, there is in the literature no consistent definition of what constitutes deprivation. In the interest of greater precision of definition, of measurement, and of delineation of causal relationships, we have devised the Home Interview Technique and the Deprivation Index.

The Deprivation Index is designed to delineate and measure specific types of deprivation within social class groupings and to define and rate areas of deprivation by the absence or presence of certain conditions. Six background variables are specified below:

1. Number of people in the home under 18 years of age:

The underlying assumption here is that the greater the number of children in the home, the greater the crowding, and the less individualized attention any single child will receive from the parent. This variable is thus scored consonant with the underlying assumption: high number of children=high deprivation.

2. School aspirations of parents for their children:

This is expressed in years of education. The underlying assumption here is that higher, more specific and knowledgeable aspirations

are held by parents from less "deprived" social conditions and therefore his variable is scored: high aspirations=low deprivation.

3. Kindergarten attendance of the child: This is expressed as either an affirmative or negative value for each child. This variable reflects some recent work indicating that children having a formal educational experience prior to entry into first grade tend to achieve and perform at higher levels in later school years.

4. Extent of engagement of child in conversation during dinner time: Recent work suggests that extensiveness of parent-child verbal interaction is related to children's interest and performance in school, so that where parent-child verbal interaction is high, unrestricted dinner conversation is most frequently found. Thus no engagement in dinnertime conversation is scored as high deprivation, while engagement in dinnertime conversation is equated with low deprivation.

5. Number of "cultural activities" engaged in with adult relations: "Cultural activities" are operationally defined as trips to zoo, museum, library, movie, sightseeing, etc. This variable represents the sum of all such activities during the weekend prior to interview for each S.

6. Housing condition: An index of housing condition based on ratings made by the U.S. Census of Housing for city blocks in New York City was calculated. Condition of housing was then rated on a seven-point scale from "sound" to "dilapidated." "Sound" housing condition is equated with "low deprivation," "dilapidated" with "high deprivation."

Each variable described above can be seen to reflect a rather specific dimension of "deprivation," as the term applies to socioeconomic conditions experienced by families in metropolitan areas. Formulation of the six variables into an over-all "index of deprivation" was made on the basis of theoretic assumptions that are controversial today. Empirically, each variable has been selected for inclusion in the index on the basis of its correlation with (1) an objective rating of socioeconomic status for each child, based on level of education and a prestige rating of the occupation of the main breadwinner in S's family, and (2) a standardized measure of reading achievement for each child.

In computing the index score for a given S, a sum score across the six variables is obtained as follows:

<u>Variable</u>	<u>Dichotomized</u>
1. The number of children under 18 in the home	1 = 3 or more 2 = 2 or less
2. Informants' educational aspiration for the child	1 = College or less 2 = Graduate School
3. Attendance of child in kindergarten	1 = No attendance at kindergarten 2 = Attendance at kindergarten
4. Extent of dinner conversation	1 = Did not engage in conversation because: Not allowed; Others participated but child did not; No conversation, no indication why; Ate alone 2 = Engaged in conversation

- |   |  |
|---|--|
| 5. Total number of cultural experiences-i.e., visiting relatives, family, museums, library, zoo, travel outside N.Y.C., school or lesson work | 1 = None<br>2 = One or more experiences (1-4)                                      |
| 6. Housing Dilapidation Index for block computed from census data   | 1 = Anything less than sound complete plumbing<br>2 = Sound with complete plumbing |

Study:

1. Relationship of Language Development to Social Class and Intelligence.

- a. Sample: 300 Negro and white male and female children, first and fifth grades, SES I, II and III.
- b. Results: (1) The level of aspiration has been found to differentiate significantly among SES and race groups on a number of cognitive variables. (2) Among older children (fifth graders), differences in verbal performances were frequently found to be associated with relative deprivation (as defined by the Institute Deprivation Index).

## II. BEHAVIORAL APPRAISAL SCALES.

Throughout the preschool enrichment program, periodic evaluations are made of teacher style, children's behavior during the class period, material (equipment) preferences, and personality characteristics. These evaluation instruments provide an objective description of several aspects of the teaching process and yield feedback to the teaching staff in an attempt to improve teaching techniques. The scales are also employed to chart changes over time within classes and for comparisons among individual teachers or classes.



A. The Teacher Observation Scale (TOS)

The Teacher Observation Scale was designed to describe teachers' characteristics relevant to the educational process. The objective is to identify the variables or techniques that contribute most to the improvement of scholastic and related skills in the children. The Teacher Observation Scale is employed while the teacher conducts a group lesson or story, including lessons that take place during circle time or snack time. Although it has been used exclusively at the preschool level, it may be applicable at higher grade levels as well.

The TOS is an act-by-act, continuous recording system similar to those devised by Bales (1951) and Carter (1952). Evaluation of the teacher's behavior during a five-minute period of observation is made according to the following categories:

1. The amount of information-giving statements, and relationship with achievement level of the child.
2. The extent to which responses are elicited from the children.
3. Extent of feedback confirmation or negation of a correct or incorrect response.
4. Efforts to maintain discipline in the classroom in terms of the amount of controlling behavior engaged in by the children.

Study:

An evaluation of the Effectiveness of an Enriched Curriculum In Overcoming the Consequences of Environmental Deprivation.

- a. Sample: 1963-1964 sample, 4 nursery teachers.



b. Results: (1) Analysis of the data revealed high interrater reliability. (2) A statistically significant difference was found among the teachers in their mode of interaction with the children. (3) Individual teaching styles appeared to be relatively stable. (4) Plans are in progress to relate teaching style to pupil achievement and attention characteristics.

B. Children's Behavior Rating Scale.

The Children's Behavior Rating Scale (CERS), developed at the Institute, was designed for use by the teachers at regular intervals during the experimental enrichment program. The items and definitions used in the scale are based largely upon the Fels, Van Alstyne and Beller rating scales of children's behavior.

The CERS consists of eight scales designed to measure eight personality characteristics of particular importance in the development of cognitive functions. The categories are: self-determination, persistence, stimulus-seeking behavior, competitiveness, response to direction, dependence, emotional control in situations of failure or frustration, and mood (cheerful-depressed). Each trait is subdivided into five graphic descriptions ranking from high (representing the child who possesses the trait to a marked degree), and low (representing the absence of the trait to be measured). Each child is measured with respect to the descriptions given; measurements are independent of the behavior of the other children in the group.

Study:

An Evaluation of the Effectiveness of an Enriched Curriculum In Overcoming the Consequences of Environmental Deprivation.

a. Sample: 24 control children, Negro male and female; summer nursery class, lower SES.

b. Results: (1) Reliability for the individual scales was in the moderate range. (2) A cluster analysis yielded essentially two clusters and suggested a "halo" effect.

:

C. Examination Behavior Scale.

This scale provides a description of the child's behavior during the individual testing sessions. It yields an 8-point quantitative scale consisting of such variables as attention, cooperation, grasp of instruction, etc., which characterize a child's behavior and permit evaluation of the nonintellective factors that may impair the child's performance on the intelligence tests. It permits comparison between control and experimental groups, as well as changes over time on these factors.

The ratings are made immediately following testing. Each item consists of five brief descriptions representing anchor points on the particular characteristics. Ratings are made on a continuum, from 0 to 4 points, the zero point representing the most extreme departure from optimum test behavior and the four point representing the optimal level. Generally, subjects who produce adequate test records will fall between the two and four points; those who are only partially testable will tend to be rated at the lower half of the scale (0 to 2). The eight characteristics described are not wholly independent. The scale is intended primarily to identify areas and the degree of difficulty encountered during the examination.

Study:

An Evaluation of the Effectiveness of an Enriched Curriculum in Overcoming the Consequences of Environmental Deprivation.

- a. Sample: All the experimental and control children of the Institute's enrichment program are rated on this scale.
- b. Results: The data are being analyzed.

D. The Location Activity Material Inventory (LAMI)

The Location Activity Material Inventory was designed primarily to describe and evaluate the effects of the physical arrangement of selected classroom materials on the behavior of a nursery school population. The LAMI provides an objective description of four aspects of the subject's behavior during the play period. The dimensions of the children's behavior selected for study include: (a) the child's geographic location in the classroom; (b) the equipment he is using; (c) his social contacts; and (d) the extent of his motor activity.

Study:

An Evaluation of the Effectiveness of an Enriched Curriculum in Overcoming the Consequences of Environmental Deprivation.

a. Sample: 1963-64 sample, 53 Negro male and female children; nursery level, lower SES.

b. Results: Based on 120 observations per child, a description of behavior during the play period (including motor activity, social interaction patterns, and preferences for types of play material) for each child was obtained. The results showed that (1) behavior patterns of the individual children were stable over time. However, in general, the group trend was from extremes in activity in either direction toward more moderate activity. For example, the more hyperactive children tended toward less active play and the activity level of the overly inactive child increased. (2) There was a tendency toward increased social peer interaction over time, the initially more isolated child showing an increase in

interactive behavior. (3) No relationship between the LAMI variables and intellectual achievement was demonstrated. (4) Further analysis and reliability studies are in process.

### III. PERSONALITY MEASURES

#### A. Self-Concept Test.

This technique developed at the Institute, is designed to assess children's concept of self. It is anchored in the social-psychological model for development of self given by George Herbert Mead. The most elemental assumptions in this model are: (1) that concepts of self are largely determined by social-perceptual processes, (2) that self-awareness is likely to be perceived as having many different attributes or characteristics, and (3) that one's self-concepts are significantly influenced not only by the perceptions that he may have of himself, but also from his own perceptions of the ways in which he is seen by other significant persons in his life.

In its present form, the Self-Concept Test is intended for use with young children. The child is required to characterize himself on 15 bipolar dimensions (i.e., happy-sad, good-looking-ugly, etc.), using for specific referents:

1. The child, as he perceives himself.
2. The child, as he perceives the way his mother sees him.
3. The child, as he perceives the way his teacher sees him.
4. The child, as he perceives the way "other kids" see him.

Each child is presented with a photograph of himself against a standard background and is given standardized instructions for posing. He is asked to give responses to the test items within each of the four referent categories. This procedure yields data which are obtained from a maximally standardized testing situation

in which a stimulus is constant and responses are comparable for all cases. Test reliability is determined by retest after three weeks with the same form and using the same photograph. Each child is given the photograph after he finishes the test.

Summative scores within each referent, ranging from 0 to 14, and an overall score for each item across referents are obtained. For example, a score for the child's perception of self as subject versus self as object, in addition to the total score across all referents are obtained. A number of other scoring procedures are presently being developed, such as measures of accuracy and congruence of perception. An independent criterion rating on the same 15 dimensions, by teachers, provides a measure of validity.

Study:

An Evaluation of the Effectiveness of an Enriched Curriculum  
In Overcoming the Consequences of Environmental Deprivation.

a. Sample: 40 Negro and white male and female nursery and kindergarten children in two schools, one in a lower SES area and one in a middle class suburban area.

b. Results: The procedure is currently being piloted on selected groups of children controlled for social class, social characteristics and general intellectual ability.



#### IV. LANGUAGE TESTS

Most of the language tests described in this section have been devised or adapted by the Institute in connection with the Verbal Survey and Enrichment projects. It is the purpose of these tests to relate verbal behavior to perceptual, cognitive, and cultural factors (particularly socioeconomic status), and to scholastic performance.

In these studies, three or four levels of analysis for approaching language behavior have been posited. The first level is referred to as labeling; the second is referred to as the relating or sequential level; and the third as the language-conceptual level. The fourth is called inventive language and deals primarily with the projective and creative aspects of language.

Labeling is analagous to the linguist's morphological analysis, and is the simplest of the three levels. In learning to label, the child learns certain invariant relationships between objects and names. He subsequently proceeds to a mastery of intraverbal relationships; this is sequential language and is analogous to the linguist's syntactical analysis. At the language-conceptual level, the concern is with the child's reliance upon verbal mediation in solving new problems and for ordering his universe by means of language. This is, therefore, the most complex of the three levels.

The Institute language measures have been constructed to tap each of these levels. Some of them cannot be rigidly classified at any one level, either because the test is itself purposely so



designed to elicit language response at more than one level for each child tested, or because the language level of the response offered by the child depends upon the particular child's developmental level or his characteristic response style.

The language tests may also be ordered along other dimensions. In general, each test may be classified as either testing comprehension of language ("receptive"), or testing of overt verbal behavior ("expressive").

In tests of receptive language, the child need only indicate, not necessarily in words, that he has understood or recognized what has been said to him. In learning a language or in solving a problem, children are able to comprehend, recognize, or identify more than they are able to express or explain verbally.

If the tests described in this section were first ordered in accordance with "language level" progression, a second ordering along the expressive-receptive progression would cross-cut the kinds of tests at the labeling, relating, and conceptualizing levels. Thus, at the labeling level, the PPVT represents a classic example of the verbal comprehension, while the WISC vocabulary test represents an expressive vocabulary test, requiring a verbal response on the part of the child.

A. Peabody Picture Vocabulary Test.

This standardized test is believed to measure the simplest form of verbal behavior (i.e., the morphological level) by relating a label to its visual counterpart. This is a multiple-choice recognition vocabulary test. The child is told a word and requested to select its referent by pointing to the picture of the word from among a set of four pictures. No verbalizations on the part of the child are necessary.

According to standardized procedures, the total raw score is the number of correct responses. Unanswered items below the basal point are assumed incorrect. The test yields a mental age score, a standard score equivalent (IQ) and a percentile equivalent.

Study:

1. Relationship of Language Development to Social Class and Intelligence.
  - a. Sample: 59 Negro and white, male and female children, SES I, II and III.
  - b. Results: Middle-class children performed better than lower-class children.
2. An Evaluation of the Effectiveness of an Enriched Curriculum in Overcoming the Consequences of Environmental Deprivation.
  - a. Sample: 164 Negro children, nursery grade, lower SES.
  - b. Results: (1) This test yields only a gross estimation of mental age at the lower age levels. (2) The results show a significant social class difference. (3) The effects of enrichment are significantly reflected in improvement in posttest performance.

B. Spontaneous Expressive-Language Tests (Clown and Rocket).

The Clown and Rocket Techniques were developed to obtain continuous speech samples from young children in order to assess various aspects of verbal skills.

a. The Clown Technique, adapted from a test originated by K. Salzinger, is designed to obtain a sample of the younger child's spontaneous expressive speech. The child is introduced to "Happy the Clown" and told that he can make "Happy" happy by talking to him, and that he can tell if the clown is happy when his nose lights up. The child's speech is picked up by a microphone hidden in the clown's neckpiece and recorded on tape. The protocols are transcribed and scored on a number of variables, including mean sentence length, number of each of the different parts of speech, and similar descriptive measures.

A rather elaborate scoring procedure has been devised, involving a number of different indices. They include a straightforward word count for the first minute and for the first five minutes of speech, the computation of ratio for each of the four major parts of speech, the computation of Type Token Ratio (TTR's) for noun-reference categories, etc. These scores, in turn, were used in (1) syntactical analyses, (2) core-thought-unit or topical analysis, (3) analysis of references, and (4) temporal analysis of the protocols.

b. The Rocket Technique is, in effect, an upward extension of the Clown Technique, designed to obtain a sample of the older child's spontaneous expressive speech. Thus far, it has been used exclusively with fifth graders. For this technique, the motivating principle is that the rocket, mounted on a plywood "sky board," climbs closer to the "moon" as the child speaks. As the rocket moves, a red light in its tail goes on. Scoring procedures are directly analogous to those used in evaluating Clown responses. Continuous speech samples were obtained in a relatively unstructured setting.

Study:

1. Communication of Information in the Elementary School Classroom.

a. Sample: 191 Negro and white, male and female, first and fifth graders, SES I, II and III.

b. Results: (1) Speech content showed that although the fifth graders talked more than the first graders, they tended to cover a wider range of content rather than to discuss any one topic more intensively than did the younger group. (2) Speech content was not found to be related in any consistent way to grade, sex, race, or social class level.

C. The Cloze Techniques (Verbal Meaning and Context Tests).

The Cloze procedure, a simple word-deletion technique, was adapted from Taylor's method of studying the comprehensibility of written communication. It provides a flexible means for using the child's ability to predict words deleted from speech samples as a measure of comprehension.

1. First Grade Cloze.

The first graders received only the auditory presentation. Verbatim sample of first grade teachers' continuous speech taped in classrooms during lessons consisted of stories with every nth word deleted. The child was required to fill in each deleted word.

2. Fifth Grade Cloze

a. Auditory Presentation Paragraphs for representing the speech of fifth grade teachers and speech samples of fifth grade children from varying social backgrounds were prepared and taped. These paragraphs with words deleted were played on the tape recorder; the child was required to fill in each deleted word.

b. Visual Presentation. The same paragraphs of teachers' and children's speech were prepared in written forms for visual presentation. The child reads each selection in which the deleted words are indicated by lines and then rereads the selection filling in each deleted word.

Three scores were developed for both the first and fifth-grade Cloze tasks. Two are measures of a child's ability predict a word that maintains the meaning of the paragraph; the

third measures the child's ability to predict the correct grammatical structure required by the omission. Specifically, the criteria for the three scores are:

1. Absolute score: The insertion is identical with the deletion, although the right word may have an altered grammatical construction, e.g., "childs" for "children."
2. Contextual score: The insertion is either identical with the original deletion or one that maintains the meaning of the original paragraph, e.g., "doctor" for "nurse."
3. Grammatical score: The insertion fulfills the exact grammatical requirement, even if the meaning differs from that of the original word, e.g., "alone" for "outside."

Study:

Communication of Information in the Elementary School Classroom.

- a. Sample: 191 first and fifth graders; male and female, Negro and white children, SES I, II and III.
- b. Results: (1) Aurally presented paragraphs were significantly related to intelligence as measured by Lorge-Thorndike Intelligence Tests (Levels 1 and 3, Nonverbal, Form A). (2) The aural mode of presentation was qualitatively more difficult for the children than the visual form. (3) The results of the primer-derived visual Cloze measures are being analyzed. (4) No significant differences were obtained in performance of first grade children with respect to socioeconomic status. Differences related to social class and sex became salient at



the fifth grade. (5) Although Negro-white differences were virtually absent, lower-class children were found to have more difficulty in comprehending the speech of their teachers and their middle-class peers than they had in understanding the speech of lower-class children. (6) Fifth-grade lower-class girls were superior in performance to lower-class boys of the same grade on the language comprehension tasks of this study. There were no differences in performance between middle-class boys and girls.

D. The Illinois Test of Psycholinguistic Abilities.

The Illinois Test of Psycholinguistic Abilities consists of a battery of tests designed to assess the areas of consistencies and discrepancies in the psycholinguistic ability of the child. The theoretical model used in this study is based on Osgood's psycholinguistic model. It is postulated that each psycholinguistic ability has three major dimensions: (1) levels of organization, (2) psycholinguistic processes involved, and (3) channels of communication. The ITPA is a collection of subtests measuring the major dimensions of psycholinguistic ability and involving different processes as well as different channels of communication. The tests are:

1. Tests of representational ability assess some aspect of the child's ability to deal with meaningful symbols, i.e., to understand the meaning of symbols (decoding), to express meaningful ideas in symbols (encoding) and to relate symbols on a meaningful basis (association).

a. Decoding.

i. The Visual Decoding Test measures the ability to do conceptual matching.

ii. The Auditory Decoding Test assesses the child's understanding of the spoken word.

b. Encoding.

i. The Vocal Encoding Test measures the ability to express ideas verbally.

ii. The Motor Encoding Test determines the ability to express an idea through gestures.

c. Association.

i. The Auditory-Vocal Association Test assesses the child's ability to relate verbal symbols (spoken words) meaningfully.

ii. The Visual-Motor Association Test assesses the child's ability to relate meaningful visual stimuli.

2. Tests of automatic-sequential ability deal with the meaningless uses of symbols, principally long-term retention.

a. Automatic Tests

The Auditory-Vocal Automatic Test measures the child's ability to use grammatical structures that he has heard in the language spoken in his environment.

b. Sequencing

i. The Auditory Vocal Sequencing Test assesses the child's ability to reproduce from memory a sequence of auditory stimuli



ii. The Visual-Motor Sequencing Test assesses the child's ability to reproduce from memory a sequence of visual stimuli.

Study:

1. Performance in Children with Cognitive Deficits.

a. Sample: 86 male and female Negro first graders (half with enrichment training and half with no enrichment training). Self-selected control group matched for age. All subjects are in lower SES.

b. Results: The ITPA scores of the enrichment sample will be compared with the standardization norms of the test and with the performance of non-enriched controls.

E. Verbal Survey Language Tests

1. Verbal Identification Test.

This Institute-devised test is basically an expressive language technique designed to measure both labeling function and conceptual ability. The test assesses the child's ability to describe and identify pictorial representations of objects, events, and people in his environment.

It yields the following measures of labeling and conceptual ability.

a. Noun Enumeration Score - the number of items identified correctly on those stimulus cards best described by a noun, e.g., kitchen.

b. Action Enumeration Score - the number of items identified correctly on those stimulus cards best described by a verb, e.g., saluting.

c. Combined Enumeration Score ( $a + b$ , above) - all the items identified correctly on the stimulus cards of the Verbal Identification Test.

d. Noun Gestalt Score - the measure of the child's ability to describe a scene with a single word when the scene is best described by a noun.

e. Action Gestalt Score - the measure of the child's ability to describe a scene with a single word when the scene is best described by a verb.

f. Combined Gestalt Score ( $d + e$ , above) - the measure of the child's ability to describe the scenes of the Verbal Identification Test with a single word.

## 2. Verbal Fluency Test

This test obtains a measure of the child's verbal fluency. It consists of the following variables and scores:

- a. Word Knowledge-the total number of words the child can say in forty-five seconds.
- b. Rhymes-the total number of rhymes given in response to a specific word. ———
- c. Sentence fluency-the child's ability to construct a sentence beginning with a specific word, a second sentence with the original word plus a second word, and finally a third sentence containing the first two words plus a third.

## 3. Word Association Test.

This test samples partially structured speech, mid-way between spontaneous and structured associations. The test consists of 14 stimulus words to each of which the subject is required to make approximately five discrete associative responses. The stimulus words were selected empirically on the basis of class differences in associative responses; middle-class children exhibited more popular (frequent, or homogeneous) responses to these stimuli than did children from the lower class.

The discrete responses are used to estimate types of syntactic and semantic associations, cognitive set and convergent-divergent thinking. Measures of latency of response to each stimulus word are obtained.

Two scores are obtained: (1) the form class score

which is the number of first word responses which are of the same form class as the stimulus word, and (2) the latency score which is the time in seconds between hearing the stimulus word and giving the first association to it.

4. Word Distance Scale.

This is a measure of the degree of relatedness of words to other words in terms of associative belongingness, or "connotative spread." The test consists of 11 stimulus words, each accompanied by a set of 10 words scaled ordinally with respect to semantic distance from the stimulus.

5. Word Utility Test.

This test assesses cultural or class differences in functional meanings. It is composed of 14 words which the child is asked to define in terms of use or function, rather than associatively or other wise.

Current work is primarily concerned with an attempt to categorize the functions of the words as designated by the child. Frequency distributions have been set up for some of the stimulus words. For example, responses to the stimulus word "stone" have been put into such categories as: constructive, esthetic, aggressive, scientific, etc. Further analysis is being made to determine whether the child's preference for particular categories is related to social class, age, and sex. The next step in this analysis is to determine whether the same category headings can be made to carry over from one stimulus word to another. At the same time, classification of all responses on a

concrete-abstract continuum is being attempted.

6. Wechsler Intelligence Scale for Children, Vocabulary Subtest.

This vocabulary subtest of the standardized Wechsler Intelligence Scale for Children is included in this battery as a measure of expressive verbal ability. The five tests described are included in the Verbal Survey battery and have been extensively analyzed. For synopsis, a summary statement is more appropriate than a detailed description of the findings for each test.

Study:

1. Verbal Survey.

a. Sample: 292 Negro and white boys and girls, first and fifth graders, SES I, II and III.

b. Results: These results are reported for all the Verbal Survey Tests. Generally, the children from lower SES backgrounds tend to show significantly poorer verbal performance than do children from higher SES backgrounds. In some specific abilities, such as verbal fluency there were no significant differences between SES groupings, whereas in the majority of verbal abilities the differences were marked. On the WISC Vocabulary Subtest, lower-class children performed significantly less well than did middle-class children.

## V. COGNITIVE TESTS

The tests described in this section have been designed to assess cognitive factors that in the Institute studies cited, are related to (1) school achievement, (2) intelligence as measured by standard psychometric instruments, and (3) nonverbal intellectual performance. In turn, the relationship between these factors and social class, experiential background, ethnic membership, and certain personality and self-concept characteristics were investigated.

### A. Concept Formation Tests.

These tests were designed to measure classification ability on the basis of qualities in the stimulus field ranging from perceptual identity to class communality. There are two forms:

#### 1. Concept Formation Test I.

In the original eight-item test, the child is presented with a booklet consisting of pictorial stimuli representing concepts of identity, similarity, class specificity (persons or animals), and class generalization (living things). The child is instructed to choose stimuli that he thinks belong together and to explain why he thinks so. Two scores are obtained: a "choice" score (number of correct responses); and a verbalization score (which is essentially an assigned rank or rating of the quality of the child's responses).

#### Study:

##### 1. Effects of Psychoactive Agents on Remedial Reading.

a. Sample: 124 Negro and white, male and female; fifth and sixth graders, lower SES.

b. Results: (1) The over-all score did not differentiate poor from normal readers. (2) When scoring was based on two separate measures, i.e., the choice of item to form the concept and the verbalized reasons for the choice, significant differences were found between the two groups of readers in their verbalized reasons for the choice, but not in the choice of item to form the concept. In an attempt to circumvent some of these difficulties, a new test, Concept Formation Test II, was designed.



## 2. Concept Formation Test II.

This test employs abstract geometrical figures, rather than meaningful objects, providing for greater experimental control over the cues elicited by the stimuli. It was designed so that the choice behavior of the subject would provide maximum information, with no necessity for obtaining their verbalized reasons. In addition, the hierarchy of difficulty of test items was based on findings of recent studies on concept formation concerning the systematic addition of irrelevant information to the stimuli that define the concept. This test uses the subject's choice alone to gain a maximum amount of information about that choice, omitting the need for a verbalized statement about the choice. The stimulus items cover four attributes,

Form: circle, square, equilateral triangle

Color: red, blue, yellow

Size: small, medium, large

Number: one, two, or three figures.

The concepts involved vary in four major ways: (1) the attribute relevant to solution (form, color, size, number); (2) the number of irrelevant cues (one, two, or three); (3) the number of relevant cues (one or two); and (4) the type of concept (conjunctive or relational). The test contains seven categories, each containing four items. In general, the four items are concepts based on form, color, size and number. The irrelevant cues were selected randomly, as were the specific dimensions of the attributes.

More specifically, the order of the seven categories is:

- I. Examples contain one relevant and one irrelevant cue.
- II. One relevant and two irrelevant cues.
- III. One relevant and three irrelevant cues.
- IV. Two relevant cues and one irrelevant cues.
- V. Two relevant and two irrelevant cues.
- VI. Relational concepts with one irrelevant cue.
- VII. Relational concepts with two irrelevant cues.

Study:

1. Visual and Auditory Efficiency and Its Relationship to Reading in Children.

- a. Sample: 168 Negro males; first, third, and fifth graders; high and low reading groups.

- b. Results: (1) The tests differentiated reading level equally well for all three age groups. (2) The mean number of correct responses in each category (based on the number of relevant or irrelevant cues) was significantly higher for older children.

B. Concept Sorting Task.

This test is designed to elicit information concerning the logical basis children use in organizing conceptual stimuli. It has been developed expressly because most verbal tests do not present the language-deprived child with adequate opportunity to perform on abstract non-verbal tasks. The Concept Sorting Task indicates the way in which children categorize objects and elicits abstracting ability either with or without appropriate verbalization. Although this test is in some respects similar to the Concept Formation Test previously described, it requires more active manipulation and initiative on the part of the child.

The child is presented with sixteen cards in random order, is instructed to sort them into piles and is then asked to explain his groupings. The cards depict vehicles, buildings, men at work, and animals. The following scores are obtained:

a. Number of Piles Score - the exact number of piles sorted by the child.

b. Sort Score - this score reflects the implicit quality of the child's sorting, e.g., sorting by class generalization receives more credit than functional pairings. The better the quality, the higher the score.

c. Verbalization Score - based on the child's explanation of his sorting, which is evaluated and scored. Higher forms of classification, e.g., generalization - get higher scores.

Study:

1. Verbal Survey

a. Sample: 139 Negro male and female first and fifth graders, SES I, II and III.

b. Results: (1) There was no difference in sorting behavior for the first graders among the SES groups. Significant differences were found between SES I and III in the fifth grades, in favor of the SES III children. (2) The verbal explanation underlying the rationale for sorting behavior did not differ for the three SES groups for the first grade. However, the SES III children were better able to verbalize their concept-sorts than the lower-class children.

C. Orientation Scale.

The Orientation Scale consists of 27 questions designed to reveal the child's capacity to judge size, number, distance, and time and to give some indication of his general and geographic knowledge. Originally the items were categorized on a hypothetical a priori basis into "cluster". The a priori assignment of items to clusters was not confirmed by a subsequent cluster analysis of the items. It was found that this test is a general test of information that correlated with tests of intelligence.

Each item of the Orientation Scale is coded and scored on a 0 to 2 point scale, depending on the age level at which it is presented and on its complexity.

Study:

1. Effects of Psychoactive Agents on Remedial Reading.

a. Sample: 124 Negro and white, male and female; fifth and sixth graders, lower SES.

b. Results: Retarded readers did more poorly than normal readers. Although the Orientation Scale was positively rated to reading level, it was not a good predictor of reading ability.

2. Verbal Survey.

a. Sample: 313 Negro and white, male and female; first and second graders, SES I, II and III.

b. Results: (1) The scale as a whole was found to possess adequate reliability for group comparisons. (2) Different

items discriminate within each grade level. These items contribute most to the reliability of the test as a whole, contribute most to the intercorrelation among the items and furnish the most potent differentiators of the grade groupings, social class, race and cultural stimuli in the home. (3) The items have greater differentiating power with respect to social class or race at the fifth grade than at the first grade level.

## VI. PERCEPTUAL-SENSORI-MOTOR LEARNING MEASURES (INSTRUMENTAL)

These instruments are designed to assess the relationship between auditory and visual functioning and reading achievement. Their general purpose is to investigate factors underlying the problems in learning to read, emphasizing particular organizations of cognitive style; modality efficiency and modality preference; non verbal learning ability, etc.

The techniques involve relatively complex apparatus, some designed and constructed entirely by Institute staff, some modified commercially available devices, and some standard laboratory instrumentation.

The following data were obtained from normal and retarded readers:

1. Reaction times to sequentially presented lights and tones.
2. Vigilance performance under conditions of auditory, visual and combined auditory-visual presentation.
3. Auditory and visual discrimination with meaningful and non meaningful material.
4. Auditory and visual memory span for words and digits.
5. Auditory and visual serial learning for words.
6. Concept formation skills.



A. Bimodal Reaction-Time Apparatus.

This testing technique, originally developed by Sutton and his associates at the Psychiatric Institute, is designed to measure responsivity to mode of stimulus and to sequences of modes. The apparatus presents four separate stimuli; a red light, a green light, a high tone (1200 cps) and a low tone (400 cps). Reaction times to sequentially presented lights and tones are automatically recorded. Several reaction time scores are obtained: (1) simple reaction time to sound; (2) simple reaction time to light; (3) reaction time to sound (or light) that was preceded by light (or sound); and (4) reaction time to light preceded by light (e.g., red preceded by green), or sound preceded by sound (e.g., 400 cps preceded by 1200 cps). The time measure is called cross-modal reaction time, while the fourth measure is known as ipsi-modal reaction time.

Study:

1. The Investigation of the Retraining Potential of Brain-Damaged Children and Adults.

a. Sample: 39 brain-damaged Negro and white children, six to 12 years of age, 39 non-brain-damaged children matched for age and IQ.

b. Results: The data are now being analyzed.

2. Effects of Atarax on the Reaction Time Performance of Schizophrenic Children.

a. Sample: 38 male and female fourth and fifth graders.

(i) 12 male and two female schizophrenic children, 6.6 to 12.1 years old, 70-113 IQ.

(ii) 14 normal males and 10 normal females 9.6 to 12.5 years old, 80 to 148 IQ.

b. Results: (1) No significant differences in reaction time to sound and light during predrug and postdrug sessions in schizophrenic subjects. (2) The difference (not significant) between the schizophrenic and normal groups in their reaction time to light and sound was greater before drugs than after. (3) In the schizophrenic group, modality shift scores did not differ significantly before and after drugs.

3. Visual and Auditory Efficiency and its Relationship to Reading in Children.

a. Sample: 48 Negro males, first, third and fifth graders, lower SES.

b. Results: (1) Older children have faster over-all reaction times. (2) Although Ss took longer to respond to stimuli which were preceded by a stimulus in a different modality, retarded readers exhibited greater difficulty than normal readers in shifting from one modality to another. (3) Responses to the bimodal stimuli are not significantly related to intelligence.

4. Perceptual Shifting and Set in Normal School Children of Different Reading Achievement Levels.

a. Sample: 24 Negro and white; male and female; fourth and fifth graders; lower and lower-middle class.

b. Results: (1) Good readers could shift responses from one sensory modality to another with significantly greater

efficiency than retarded readers. (2) The ability to shift response from one sensory modality to another does not appear to be related to intelligence, although there is a close relationship between modality shifting and reading achievement and retardation.

B. Modality Preference Test.

This Institute-developed test measures preference for one sense modality over another, determining whether a subject prefers the auditory or visual mode of stimulus presentation. This test consists of two six-foot-long boxes containing four auditory and four visual stimuli, hidden behind wooden panels. Each stimulus panel contains a red button, which when pressed, both activates the stimulus and deflects a stylus on an attached impulse recorder. The four visual stimuli employed are a pattern of white lights, a pattern of colored lights, a picture, and a moving spiral. The auditory stimuli are a buzzer, a bell, a train whistle, and a music box. After the examiner demonstrates the apparatus, each subject is permitted to play the game for four minutes. The number and duration of presses for each stimulus are recorded on wax paper by two four-channel impulse recorders.

Study:

1. Visual and Auditory Efficiency and Its Relationship to Reading in Children.
  - a. Sample: 48 Negro male first, third, and fifth graders, good readers and poor readers.
  - b. Results: The good and poor readers do not differ on auditory and visual preferences.
2. The Investigation of the Retraining Potential of Brain Damaged Children and Adults.
  - a. Sample: 39 brain-damaged and 39 nonbrain-damaged Negro and white children, ages six to 12 years, matched for IQ.

- b. Results: The findings for the brain-damaged children as compared with the non brain-damaged children are being analyzed.

2

C. Trimodal Tests of Perception Under Conditions of Stimulus Interference.

This test series has been used to evaluate the retraining potential of brain-damaged children. It provides a measure for the child's visual, auditory, and tactual perceptual abilities.

The scores on each of these tests is the number of steps required to identify correctly the stimulus in each series.

1. Visual.

In the visual area the tests include items graded along a continuum of difficulty and complexity. As a series progresses, there is a decrease in the density of masking of the superimposed pattern; and a decrease in the complexity of the background drawings in which the stimulus figure is embedded. In the "reduced cues" task, a series progresses from an incomplete figure with a few lines to a representation of the whole object.

a. The Dot Masking Test.

Originally designed by E. S. Gollin, this test measures ability to recognize a stimulus picture hidden by a random overlay of dots. The task involves identification of drawings through a "mask" of superimposed stipplings. There are one practice and five test series. Each series consists of four pictures of a particular object. Dot density decreases as the series progresses. Each picture is presented tachistoscopically for three seconds.

b. The Grid Masking Test.

This test involves the identification of drawings in which the overlay is a patterned grid rather than random stippling, thus providing more direct interference. It is directly analogous to the

Dot Masking Test described above, both in purpose and administration, except that the interference is accomplished by grid lines.

c. Hidden Figures Test.

In this test, the child is asked to identify familiar objects or abstract figures embedded in other similar but more complex figures. There are five series of hidden pictures having identical structural strength in all steps. Each series has a particular kind of meaningful background that masks the stimulus pictures. Successive steps in a series have decreasingly complex backgrounds and thereby less masking.

d. Reduced Cues Test.

This test designed by E. S. Gollin, is used for the identification of reduced line representations of familiar objects or forms. It consists of six series of "reduced line" stimuli (one practice and five test series) each series having five steps presented separately.

2. Auditory

These tests involve discrimination of sounds masked by decreasing levels of superimposed noise.

a. White Noise Masking Test.

This test measures the ability to recognize a common sound masked by white noise. A series consists of five binaural (ear-phone) presentations of a tape-recorded sound stimulus. The masking is by white noise of progressively decreasing density, stimulus intensity remaining the same throughout a series.



b. Beep Masking Test.

This test consists of one practice and four test series. Each series includes eight ten-second recordings of a common sound. The first seven stimuli in each are masked by a pure tone beep of 1000 cps. As a series progresses, beep "on time" and beep "off time" increases, thereby decreasing the masking effect. The last step in each series is recorded at the same intensity as that used in the preceding steps but is unmasked in order to test for the child's possible inability to recognize stimuli regardless of masking.

c. Classroom Noise Masking Test.

This test involves the use of common stimulus words of one, two, or three syllables. The rest consists of seven repetitions of the same word at a fixed intensity in each of the steps of any given series. The first six steps in each series are masked by recorded classroom noise. Both density and intensity of the masking decrease with each successive step, the last step in each series being unmasked.

d. Auditory-Motor Test (Drum Test).

Twenty separate rhythmic patterns in an ascending order of difficulty are presented one at a time to the subject, by tapping a small drum. The subject, seated facing away from the examiner, must try to reproduce each pattern on a second drum.

3. Tactile.

To avoid contamination by visual cues, all tactile tests are administered by means of a large, curtained box. The subject puts his hands through the curtains of the box to feel the stimulus objects.

a. Bag Masking.

This test was designed to measure the ability to identify a stimulus using the haptic sense only. There are one practice and five test series. A series consists of five identical toys, each wrapped in gauze bandages inside cotton bags. The number of layers of bandage and number of bags decrease progressively with each step in a series, making it progressively easier for the subject to identify the stimulus object.

b. Tack Forms Test.

The Tack Forms Test, an Institute adaptation of an experimental technique developed by Gollin, was designed to measure the ability to discriminate among geometric forms by means of the sense of touch alone. Six basic geometric designs, made by driving upholstery tacks into eight inch square plywood boards, are used: square, circle, cross, equilateral triangle, diamond, and diagonal. The subject is to identify, solely by touch, the correct comparison stimulus and to indicate his choice by pointing.

In the first series, there is no masking overlay on the standard stimulus. For the second series, larger headed tacks are randomly distributed on the standard stimulus board. In the third series, the usually straight lines of the geometric forms are slightly curved on the standard stimulus. The curved arrangement of the forms plus the random distribution of interfering tacks provides the masking of the standard stimulus for the fourth series. The comparison stimuli are never masked.

c. Texture Test.

This test is designed to measure a subject's ability to make tactile discriminations of three-dimensional materials, rather than formal outlines (such as the tack forms). The subject touches single standard materials (chalk, canvas, slate, etc., mounted on 3 inch x 3 inch plywood boards) and is then asked to identify the standard when it is presented along with three other stimuli.

Study:

1. The Investigation of the Retraining Potential of Brain-Damaged Children and Adults.
  - a. Sample: 39 brain-damaged and 39 non brain-damaged, Negro and white children, six to 12 years old.
  - b. Results: The data are in the process of being analyzed.

D. Purdue Pegboard Technique.

This test is a specific measure of the speed and accuracy of visuo-motor (eye-hand) coordination. It has a secondary use as an index of hand dominance over laterality. The equipment consists of a board containing two rows of holes and a series of metal pegs in trays at the top of the board. The subject's task is to place pegs in holes for 30 seconds. The scores obtained include the number of pegs placed in the holes with the right hand, the number placed with the left hand and the number placed with both hands simultaneously.

Study:

1. Effects of Psychoactive Agents on Remedial Reading.

a. Sample: 58 Negro and white (predominantly Negro) children; selected on the basis of reading ability (normal readers, retarded readers not matched for age, retarded readers matched for age). Treatment was either placebo, Atarax, or no treatment, fifth and sixth graders, lower SES.

b. Results: 1) Right hand scores showed significant improvement over time for all three treatment groups. 2) Left hand scores showed no changes. 3) Both hand scores showed differences among the treatment groups, but this was due to the lower pretreatment scores for the no drug or placebo group.

E. Pattern Board.

The electronic pattern board consists of two panels:

(1) A stimulus display panel containing 100 translucent push buttons arranged in a 10 by 10 row and column matrix. Each push button contains a small lamp that can be lighted and extinguished by successive pushes of the button. At the top of the panel is a small box which can present feedback to the subject in the form of a red light, a green light, a high tone or a low tone. Feedback can be controlled by either the experimenter or the subject's response. (2) A control panel consisting of a 10 by 10 matrix of three-position switches operated by the experimenter. Electronic counters code the total number of responses and the number of correct responses.

The subject is seated facing the display panel and the workings of the push-buttons and lamps are explained to him. Then six tests of various aspects of visual perception are presented to him one at a time. These are as follows:

1. Recognition from memory: The subject is shown a 5 x 5 cross in the upper left-hand corner of the board for 20 seconds and asked to remember it. The cross is extinguished and three successive patterns are lighted one at a time in the lower right-hand corner of the board: a 5 x 5 square, a 5 x 5 square with a cross within, and a 5 x 5 cross. For each, the subject is asked whether the pattern is just like what he had been shown before. All responses are recorded.

2. Matching: This test is identical to the former Test except that the 5 x 5 cross standard stimulus remains lighted for each comparison.

3. Reproduction from memory: The subject is shown a 9 x 9 cross on the board for 20 seconds and is asked to remember it. After the lamps are extinguished, he is told to push the buttons he has seen lighted. The number of correct responses, total number of responses, and time until the last response are recorded.

4. Copying: A 5 x 5 cross is presented in the upper left-hand corner of the board and the subject is instructed to "copy" it by pushing on buttons in the lower right-hand corner of the board. Sequence of response and time until the last response are recorded.

5. Reproduction from memory in the face of an interfering field: This test is similar to Test 3, except that, after the pattern is extinguished, a 27-button interference field is lighted to make the reproduction task more difficult. Feedback is employed for this test as in Test 3, and the times and responses are recorded as above.

6. Pattern delineation: In this test the same pattern is used as in Test 5. The subject's task is to push off the interfering field and leave the pattern lighted. Feedback is employed for this test, and times and responses are recorded as above.

Study:

Drugs and Psychological Functions Underlying Learning.

- a. Sample: 24 schizophrenic children, 6.5 to 14 years old, Negro and white, male and female, predominantly lower SES; 30 control children from a children's shelter matched for age, Negro and white, male only, predominantly lower SES.
- b. Results: The data are now being analyzed.



## **VII PERCEPTUAL-SENSORY MOTOR-LEARNING MEASURES (NONINSTRUMENTAL)**

Included under this heading are techniques directly comparable to those described in the preceding section, which typically comprise part of the same larger batteries. Their general purpose is to investigate factors underlying success in learning to read and write, namely, perceptual accuracy and organizational ability, modality efficiency and modality preference, and nonverbal learning ability.

The techniques are described separately from those in the preceding section because they involve no complex equipment. In some instances, this distinction is somewhat arbitrary, since tape recorders are used for either presentation of auditory stimuli or recording of responses, and memory drums are used for the presentation of visual stimuli, in order to insure standardization and accuracy.

**A. Number Scanning Test.**

This test was designed to assess some organizational abilities similar to those used in reading. It consists of a standard sized sheet of white paper on which 100 numbers are printed in a random arrangement. The sheet is presented to the subject with the instruction to read the numbers as fast as he can. The child's responses are recorded on tape. The basic scoring rationale involves adequacy of organization, particularly in terms of its conformity or resemblance to a logical horizontal reading pattern from left to right.

**Study:**

**1. Effects of Psychoactive Agents on Remedial Reading.**

a. Sample: 58 Negro and white (predominantly Negro) children, fifth and sixth graders, lower SES, selected on the basis of reading ability, (normal readers, retarded readers matched for age, and retarded readers not matched for age). Treatment was placebo, Atarax, or no treatment.

b. Results: The results indicate that Atarax significantly influences the type of behavior measured by the test, i.e., the group under drug treatment was judged to have significantly more organized perception than the other two groups. The second posttest (no drugs) showed no significant difference among groups.

**B. Auditory and Visual Memory Span Tests.**

These tests measure the child's immediate auditory and visual memory span by means of digits, verbal material, or pictures. Digit span is tested both aurally and visually, with items ranging from two to eight digits. Visually they are presented on a card which the child is allowed to study for one second. Testing is discontinued if the child misses two consecutive items at any level.

**Study:**

**1. Visual and Auditory Efficiency and its Relationship to Reading in Children.**

a. Sample: 72 Negro and white, male and female children, first, third, and fifth graders, lower SES.

b. Results: Digit span: (1) Older children and good readers do better than younger children and poor readers. (2) The auditory form of the test elicited better performance than the visual form. (3) There was no relationship between digit span scores and the Lorge-Thorndike IQ scores for the first through fifth grades. Verbal Material: (1) As anticipated, on the memory for verbal material, poor readers exhibited shorter memory spans than good readers. (2) All children exhibited poorest performance on aurally presented stimuli. (3) No age differences were noted on this task.

C. Serial Learning Tasks.

This technique compares the child's learning performance when material is presented visually with his learning performance when material is presented aurally. The materials (words or pictures) are presented serially. Serial learning is measured by the number of correct responses made to fifteen trials of the pictures and words. In addition to the single auditory and single visual presentation, a combined test is also administered.

Study:

1. Effects of Psychoactive Agents on Remedial Reading.

a. Sample: 58 Negro and white (predominantly Negro) children, fifth and sixth graders, lower SES, selected on the basis of reading ability, (normal readers, retarded readers matched for age, and retarded readers not matched for age). Treatment was placebo, Atarax, or no treatment.

b. Results: Using auditory and visual forms alternately, a ratio of auditory to total (auditory and visual) words recalled showed no significant amount of variance or time-by-treatment interactions.

2. Visual and Auditory Efficiency and its Relationship to Reading in Children.

a. Sample: 168 Negro male children, first, third and fifth graders, lower SES.

b. Results: (1) This task best differentiates reading level among younger children. (2) Although poor readers learned

more slowly on all tasks, they had particular difficulty with auditory stimuli. (3) For the sample as a whole, visual presentation was easiest, whereas the auditory modality presented the greatest difficulty. An exception to this was the first-grade potentially poor readers, who had the lowest scores on the combination form.

D. Memory for Designs Test.

The Memory for Designs Test was developed by Graham and Kendall in their work with brain-damaged subjects. The test involves the presentation of geometric designs and the reproduction of these designs from immediate memory, for the purpose of detecting impairment in the visual perception. In an Institute study with seven and eight-year-old children, the initial parts of the standard Graham-Kendall were found to be too difficult. Seven simpler cards were designed: (1) a vertical line, (2) a horizontal line, (3) a diagonal line, (4) an L, (5) an inverted L, (6) a square, (7) a square with a cross inside it. According to standardized Graham-Kendall procedures, the total score on the test is the sum of the scores for each design. The score for each design is determined by the number and type of errors made. The higher the score, the poorer the performance.

Study:

The Investigation of the Retraining Potential of Brain-Damaged Children and Adults.

- a. Sample: 39 brain-damaged, and 39 nonbrain-damaged Negro and white boys and girls, six to 12 years of age.
- b. Results: The data are being analyzed.

E. Auditory Discrimination Tests.

These tests, designed to evaluate auditory perceptual skills, involve four areas of auditory perception: sound recognition, discrimination, attentiveness, and memory.

1. Recognition Tests.

These tests cover a range of difficulty from the recognition of environmental sounds to the recognition of words and the recognition of phonemes.

a. Environmental Sounds (Picture Identification)

Twenty familiar environmental sounds are played on a tape recorder. In selecting these sounds, an attempt was made to include only those sounds likely to be part of the child's environment that can be reproduced as unambiguously as possible. For each of the sounds, the child is presented with four pictures. He must point to the one that represents the sound he has just heard.

b. Environmental Sounds (Labeling).

Nineteen familiar environmental sounds (different from the ones in the picture identification test) are played on a tape recorder. After each sound, the examiner asks the child to name the sound he has heard.

c. Phonemes.

The child must repeat each of 48 phonemes played on a tape recorder. All consonants in initial and final position, vowels, frequent double blends, and frequent triple blends are used.



Also included are those phonemes that are the most visually confusing to read.

d. Word Repetition.

The child is required to repeat each of 30 words played on a tape recorder.

e. Word Picture Identification.

This is a 20 word test (nouns only) requiring the child to select from among five pictures the one corresponding to the stimulus word that is played on the tape recorder. The stimulus words, as those in the word repetition test, were chosen from a list of words representing a full range of phonetic elements. The recognition level of the words has been limited to beginning first grade. In selection of the multiple-choice alternatives for the stimulus word, words were chosen that, were both phonetically similar to the stimulus word and which were familiar to the child.

Study:

Effectiveness of Training for Retarded Readers in the Auditory Perceptual Skills Underlying Reading.

a. Sample: (1) 64 Negro and Puerto Rican male and female retarded readers, third graders, lower SES. (2) 36 Puerto Rican and Negro male and female retarded readers, third graders, lower SES.

b. Results: The data are being analyzed.

2. Sound Discrimination Tests.

a. The Wepman Auditory Discrimination Test

The Wepman Auditory Discrimination Test is designed

to determine a child's ability to perceive fine differences between aural stimuli composed of words. The test has been found useful in discriminating among children in the early elementary school years, who are slower than their peers in developing auditory discrimination. This ability has been found to be highly related to the development of speech accuracy and somewhat related to reading ability.

The test is presented by means of prerecorded tape to insure standardization of procedures and to avoid "contamination" of the results by such irrelevant variables as regional or idiosyncratic speech characteristics of different examiners. The presented task is a list of 40 word pairs matched for familiarity by selecting words as close together as possible from the Large-Thorndike Teacher's Word Book of 30,000 words (1944). (Examples: tub-tug, thread-shred, shack-sack, and pen-pin, among the "differences" pairs; lack-lack, tall-tall, etc., among the "sameness" pairs).

The child is asked to listen to the examiner read pairs of words, and to indicate whether the words are the same or different. The instructions are repeated on tape just prior to the presentation of the 40 pairs. Two "error" scores are obtained: (1) the number of instances of the child's reporting that the stimuli are the same when they are actually different; and (2) the number of instances of the child's reporting differences when the words are actually alike.

Study:

1. Visual and Auditory Efficiency and its Relationship to Reading in Children.

a. Sample: 48 Negro males, first, third, fifth graders, lower SES, differentiated on the basis of reading level: one-half of the subjects in the upper one-third in reading ability and one-half of the subjects in the lower one-third in reading ability.

b. Results: (1) This test differentiated first from fifth graders, and good from poor readers. (2) Differentiation between the reading groups was less for the older children than for the younger ones.

2. The Investigation of the Retraining Potential of Brain-Damaged Children and Adults.

a. Sample: 39 brain-damaged, and 39 nonbrain-damaged Negro and white boys and girls, six to 12 years of age.

b. Results: The data are in the process of being analyzed.

3. Performance in Children with Cognitive Deficits.

a. Sample: 86 Negro male and female children, first graders (half with enrichment training and half with no enrichment training). Self-selected control group matched for age; all in lower SES.

b. Results: The data are in the process of being analyzed.

4. A Study of the Effectiveness of Training for Retarded

Readers in the Auditory Perceptual Skills Underlying Reading.

- a. Sample: 64 Negro and Puerto Rican male and female retarded readers, third graders, lower SES.
- b. Results: The data are being analyzed.

3. Attentiveness Test.

a. The Continuous Performance Test.

The purpose of these tests is to measure auditory attentiveness. The Continuous Performance Test, an adaptation of a test described by Rosvald to differentiate brain-damaged from normal subjects, is a test of vigilance performance under conditions of aural, visual, and combined aural-visual presentation. Watch-keeping performance for specific signals is measured separately for auditory and visual modalities and for both modalities combined. For five minutes, the child hears the names of colors through earphones. He is told to press a button when he hears the appropriate stimulus word (red). Out of a total of 310 colors read, red is heard 80 times at variable intervals.

Study:

1. Visual and Auditory Efficiency and its Relationship to Reading in Children.

- a. Sample: 168 Negro males, first, third, and fifth graders.
- b. Results: (1) Older children and better readers performed better on the C.P.T. (2) More anticipatory responses,

i.e., pressing the button before giving a response, were given by younger children and poorer readers. (3) All children performed better on the auditory than the visual modality. (4) There was a greater discrepancy between auditory and visual vigilance performance for poor readers than good readers.

2. A Study of the Effectiveness of Training for Retarded Readers in the Auditory Perceptual Skills Underlying Reading.

a. Sample: (1) 64 Negro and Puerto Rican, male and female retarded readers, third graders, lower SES, (2) 36 Negro and Puerto Rican male and female retarded readers, third graders, lower SES.

b. Results: Findings of this study are currently being analyzed.

3. The Investigation of the Retraining Potential of Brain-Damaged Children and Adults.

a. Sample: 39 brain-damaged Negro and white children six to 12 years of age; 39 nonbrain-damaged Negro and white children matched for age.

b. Results: Findings of this study are presently being analyzed.

4. Performance in Children with Cognitive Deficits.

a. Sample: 36 Negro male and female children, first graders (half with enrichment training and half with no enrichment training). Self-selected control group matched for age; all in lower SES.

b. Results: The data are in the process of being analyzed.

## VIII. DOMINANCE-LATERALITY TESTS

The tests included in this section are designed specifically to investigate the lateral-dominance factors associated with neural organization and discussed in the extensive literature on speech, as well as deficits in reading, writing, and other learning disabilities.



A. Lateral Dominance Test.

This test is a modification of the Harris Test of Lateral Dominance and is designed to measure dominance in motor or sensory capabilities of one side of the body over the other.

The test includes items measuring hand, eye, and foot preferences and such tasks as simultaneous writing of numbers with both hands without visual feedback. Dominance is measured both by noting the individual's lateral choice in situations when he is free to use either the left or right part and by comparing the quality or accuracy of his performance in situations in which he performs the identical task with the left and the right member alternately or simultaneously.

From results of other studies, it appears that right-left discrimination is correlated with reading difficulty in younger but not older children. However, the relationship appears to be a correlative rather than a causal one.

Study:

Effects of Psychoactive Agents on Remedial Reading.

a. Sample: 58 Negro and white (predominantly Negro), lower SES, selected on the basis of reading ability (normal readers, retarded readers not matched for age, retarded readers matched for age). Treatment was placebo, Atarax or no treatment.

b. Results: (1) No significant differences were found between the normal and retarded reading groups in hand,



eye, or foot dominance, or in any combination of hand, eye, or foot dominance. (2) These findings suggest that mixed and crossed lateral dominance which are sometimes correlated with reading disability in younger children do not appear to be causally related to right-left discrimination and reading ability.

**B. Left-Right Discrimination Test.**

This is an Institute modification of a technique designed by Benton. It attempts to measure the ability of the individual to locate anatomical parts of his own body, of that of another person (the examiner), and of a pictorial representation of another person, with reference to the directions "right" and "left". This ability normally develops with age and has been found to be impaired in many brain-damaged persons. In actual administration, the subject is instructed: (1) with eyes open, to point to single lateral parts, and then to perform the same tasks with eyes closed; (2) with eyes open, to execute double crossed and uncrossed commands, and then to repeat these operations with the eyes closed; (3) to point to lateral body parts on a schematic, front view representation of a person; and (4) to execute double-crossed and uncrossed commands involving lateral body parts of both the subject and the schematic representation.

**Study:**

**Effects of Psychoactive Agents on Remedial Reading.**

a. Sample: 124 Negro and white male and female, fifth and sixth graders, lower SES.

b. Results: This test did not discriminate between normal and retarded readers on the "own body" tasks or on the "mixed" tasks. On "other person" tasks (the pictorial representation), differences were not found between normal and retarded readers when differences in WISC IQ scores were controlled by analysis of covariance.

## IX READING TESTS

The "Reading Battery" is composed of tests that assess reading ability on several levels, those that assess a measure of the child's over all reading achievement, and those that assess specific reading skills which are a part of general reading competency. In addition, a Reading Prognosis Test has been developed to predict a child's future competence on the basis of underlying reading skills, as well as to delineate areas of underlying skill deficiencies for remediation.

A. Reading Prognosis Test.

This test measures underlying reading skills viewed as basic for later reading achievement. Three areas of skills are measured: language, perceptual discrimination, and beginning reading skills. In each area, several subtests are included as follows:

1. Language

a. Meaning Vocabulary - This measures the child's ability to define words.

b. Storytelling - The child is asked to tell a story about four pictures that present a simple sequential action. The test measures the child's ability to organize and tell a story using all the pictures. This test has undergone several validation studies over a four-year period.

2. Perceptual Discrimination

a. Visual Discrimination - This subtest measures the child's skill in discriminating differences in symbols.

b. Visual Similarities - This subtest is a measure of skill in matching symbols.

c. Auditory Discrimination - This subtest measures the child's ability to distinguish differences in words presented aurally.

3. Beginning Reading Skills

a. Alphabet Letters - This test measures knowledge of names of lower-case letters.

b. Sight Vocabulary - This test measures the extent of the child's recognition of words. Words the child has seen at home and words taught in the initial lesson in school.

are included.

Study:

Reading Prognosis Validation Study.

- a. Sample: 138 Negro and white males and females, beginning first graders, lower and middle SES.
- b. Results: The revisions of the test were a result of four validation studies. The present version of the test is being prepared for piloting and subsequent standardization.

B. Silent Reading Tests.

1. Gates Primary Reading Test, Paragraphs, and  
Gates Advanced Primary Reading Test, Paragraphs.

These tests were designed for use in the primary grades, to measure the child's ability to comprehend material read silently and independently. They consist of a series of paragraphs of graded difficulty. The child is asked to complete a task given in each paragraph, usually to make a mark on one of the pictures accompanying each item. It is easily administered to a group. The time limit is 25 minutes for the 32 items.

The raw score is the total number of correct items. Tables are available for conversion to comparable grade scores. The range of norms is from late first grade to sixth grade.

C. Oral Reading Test.

1. Gates-McKillop Diagnostic Test--Oral Paragraphs.

This test is a measure of the child's oral reading skills, i.e., his ability to read aloud smoothly and meaningfully. In addition to the "formal" score, a record of the kind of errors the child makes, his method of word attack, and his general test behavior is kept and assessed. In format, there are seven paragraphs of graded difficulty in each of two equivalent forms. They are designed to be used with children from early second grade through the eighth grade.

Study:

Effects of Psychoactive Agents on Remedial Reading.

a. Sample: 124 Negro and white, male and female children, lower SES, selected on the basis of reading ability.

Group I: 60 retarded readers, fifth and sixth graders; 1/3 received Atarax, 1/3 received placebo, 1/3 received no treatment, all received remedial instruction.

Group II: 35 normal readers, fifth graders, not matched in age with Group I.

Group III: Reading retarded group matched for age with Group I.

b. Results: (1) Group I subjects improved in reading over time, however no differences in reading improvement was found among the subgroups, (2) the group receiving Atarax



had lower scores in the Gates Advanced Words Test on the first posttesting than the other two subgroups. Six months later, the scores for the groups did not differ, on the second post-testing, (3) Group II (normal readers) showed expected better performance than the retarded readers in Groups I and III; (4) There were no significant differences between the two groups of retarded readers.

D. Diagnostic Reading Series

1. Sight Vocabulary - This test is a variation of the Gates Sight Vocabulary Test. It consists of 40 words in order of increasing difficulty, and measures the child's ability to pronounce words correctly at first sight. It taps the child's fund of known words. The child is allowed five seconds for each word. The raw score is the total number of correct responses. A table is provided to translate this raw score into a corresponding grade-equivalent score. Norms are given for the first through the early sixth grade.

2. Word Parts Test - This test is an adaptation of the Roswell-Chall Diagnostic Reading Test. It is designed to assess various word-analysis skills underlying reading. The test contains three sections: sounds, words, and syllabification. Among the sounds are included the basic elements of consonants, vowels (both long and short), and consonant blends. The section on words tests knowledge of words containing short and long vowels and diphthongs in words. The section on syllabification measures skills in working out unknown words. The test can be administered to children who have had some instruction in reading and is usable with children from the first through the fifth grades.

Study:

Effects of Psychoactive Agents on Remedial Reading.

a. Sample: 124 Negro and white, male and female children, lower SES, selected on the basis of reading ability.

Group I: 60 retarded readers, fifth and sixth graders; 1/3 received Atarax, 1/3 received placebo, 1/3 received no treatment, all received remedial instruction.

Group II: 35 normal readers, fifth graders, not matched in age with Group I.

Group III: Reading retarded group matched for age with Group I.

b. Results: (1) Sounds - all the Group I drug groups improved over time, with no significant difference among the subgroups (Atarax, placebo, or no drugs). (2) Words and Syllables - neither improvement over time nor differential subgroup improvement was found.

## X. INTELLIGENCE MEASURES.

As stated elsewhere in this Index, many of the Institute or Institute-adapted tests described under other headings are, in effect, measures of certain aspects of intellectual functioning or, are at least, highly correlated with "intelligence." However, since they are used in Institute studies not as intelligence tests per se but rather as measures of some special aspect of verbal facility or of cognitive level, in a specific "operational" context, they are not included here.

This section includes descriptions of only those tests extensively used at the Institute as actual intelligence measures, where such scores are needed in addition to, and separate from, whatever estimates of intellectual capacity or potential might be derived from the child's performance on other tests. Accordingly, unless otherwise noted, standard procedures of administration and scoring are followed.

A. Lorge-Thorndike Tests.

Two levels of these tests are used extensively in Institute studies and form an integral part of several Institute batteries. The Primary battery is comprised of three subtests: (1) Verbal, (2) Conceptual, (3) Perceptual. The Level III (fifth grade) battery is in two parts, the Nonverbal and the Verbal.

Study:

- 1. Verbal Survey.

a. Sample: 292 Negro and white children, first and fifth graders. SES I, II and III.

b. Results: (1) Over-all IQ differences between the grades were minimal. (2) For the fifth grade level, children who had preschool experience scored significantly higher than those without this experience. The difference as predicted by preschool experience was not significant for the first grade, although the directionality was still apparent. (3) The differences between classes and races were significant except for the comparison between Negro and white children at SES I (the lowest social class level), the white children doing better than Negro children at levels II and III. (4) Children coming from homes with father present were found to score significantly higher than children from fatherless homes. In addition, a constricted range of performance was found among fifth graders without fathers in the home, as opposed to both first and fifth graders in homes with fathers.

2. Communication of Information in the Elementary School Classroom.

a. Sample: 167 Negro and white male and female

children, first and fifth graders, SES I, II and III.

b. Results: (1) First-grade, SES I subjects obtained a lower mean IQ score than either SES II or SES III; no significant differences in IQ scores between SES I and II were noted. There was no relationship between IQ and race and sex when comparisons were made across social class subgroups. (2) Among fifth graders, significant differences in mean IQ scores in the expected direction were obtained between SES I and II, and I and III, but no differences were found between SES II and SES III groups. A significant difference in mean IQ favoring whites was obtained for the Negro-white comparisons.

B. Columbia Mental Maturity Scale.

The Columbia Mental Maturity Scale was chosen for its special suitability in evaluating preschool children and its usefulness in longitudinal studies of these youngsters. This test is a recently re-standardized, nonverbal, individually administered intelligence test. It is simple, attractive, and intrinsically interesting in format and requires a relatively brief administration time. Essentially, it is a test of the child's conceptual or "reasoning" ability and his ability to organize visually perceived stimuli.

The test is comprised of 100 cards (6 inches x 19 inches) with from three to five pictures of simple geometric forms or representations of objects, animals, and persons. Color is also used, both as a systematically varied feature of the pictures, comprising one of the "principles" on which the classification of stimuli is based, or as an irrelevant "distractor."

Study:

An Evaluation of the Effectiveness of an Enriched Curriculum in Overcoming the Consequences of Environmental Deprivation.

a.) 1962-63 Sample: 76 experimental and 88 control subjects, Negro male and female children nursery level, lower SES

b.) Results: (1) Mean gains in IQ score from pretesting to posttesting revealed a significantly higher posttest performance



for the experimental group than for the control group. (2) An analysis of mean gain in IQ from pretesting to posttesting revealed that the experimental group maintained its performance, whereas the control group showed a significant decrement.

a<sub>2</sub>) 1963-64 Sample: 53 experimental and 19 control subjects, Negro female and male children, nursery level.

b<sub>2</sub>) Results: (1) There was no significant gain in IQ from pretesting to posttesting for the experimental group, whereas the control group showed a significant decrement in mean IQ from pretesting to posttesting. (2) There was a significant difference in mean IQ between the experimental and control groups posttest performance.

C. Wechsler Intelligence Scale for Children (WISC).

The WISC is one of the best known and most widely used individual intelligence tests. It consists of a Verbal Scale and a Performance Scale, with six subtests in each, and yields a Full Scale or composite IQ score.

Study:

Effects of Psychoactive Agents on Remedial Reading.

a. Sample: Three groups of a total of 124 Negro and white male and female children, fifth and sixth graders, lower SES.

Group I: 50 retarded readers (one to four years of retardation) attending summer classes. One-third recieved Atarax; one-third received placebo; one-third received no treatment. All received remedial reading training.

Group II: 35 normal readers, fifth graders.

Group III: 29 retarded readers, fifth graders.

b. Results: In general, retarded readers perform at a significantly poorer level on the WISC total and subtest scores than do normal readers. More important, they have very different subtest intercorrelations. (The WISC was not administered under drug conditions.)

D. Arthur Point Scale of Performance (Revised Form II).

This test provides a means of measuring the intellectual abilities of children with hearing loss, of children suffering from severe reading disability, and of those with delayed or defective speech. It is an individual test and requires no speaking either by the administrator or from the subject. At the Institute the Arthur-Point-Scale of Performance has been used as a general screening test for studies involving brain-damaged children.

Study:

An Investigation of the Retraining Potential of Brain-Damaged Children and Adults.

- a. Sample: 39 brain-damaged and 39 non-brain-damaged Negro and white children, 6-12 years of age.
- b. Results: The data are currently being analyzed.

E. Stanford-Binet Intelligence Scale (Form L-M).

This intelligence scale provides a single IQ score describing the child's present level of general intellectual ability. It is one of the most widely used and highly reliable tests for measuring intellectual abilities of preschool children.

The Stanford-Binet also has the advantages that the verbal items are similar in content to several of the language tests employed in studies of slightly older populations. For example, content analysis of the two to six year Binet test items has revealed that 12 of the 48 subtests could be categorized as tapping expressive language functions, five subtests tap receptive language functions, nine tap perceptual tasks, and four tap memory tasks.

Study:

An Evaluation of the Effectiveness of an Enriched Curriculum in Overcoming the Consequences of Environmental Deprivation.

a<sub>1</sub>) Sample: 1962-63, 90 Negro male and female (experimental) children with preschool experience and control children with no preschool experience, lower SES.

b<sub>1</sub>) Results: (1) There was a significantly higher mean posttest performance for the experimental group than for the control group. (2) Although the mean gain of the experimental group from foretesting to posttesting was statistically significant and sizeable, it did not differ statistically from the gain made by the control group.

a) Sample: 1963-64 53 experimental nursery school children (with preschool experience), 19 control nursery school children (with no preschool experience), lower SES.

b) Results: Both the experimental and control groups showed a significant improvement from foretesting to posttesting. There was no significant difference in the mean increase in IQ between the experimental and control groups.

F. California Test of Mental Maturity.

This is a standardized, group-administered intelligence test, ranging from perprimary to an advanced level. It is designed to assess mental processes in five areas: memory, spatial relationships, logical reasoning, numerical reasoning and verbal concepts. It yields language and nonlanguage, as well as total, MA and IQ scores.

Study:

Program for Cognitive and Motivational Development of the Scholastically Retarded Child.

- a. Sample: 160 Negro and Puerto Rican male and female children, kindergarten level, lower SES, 84 children were retested.
- b. Results: (1) The mean IQ was in the low average range. (2) Contrary to expectations there was a somewhat higher language than nonlanguage IQ. (3) Scores tended to be stable as reflected in moderately high test-retest correlations, except for the spatial relations factor. (4) There was a significant relationship between CMM scores and teachers' ranking estimates of childrens' intellectual ability.

G. Pictorial Test of Intelligence (French).

This test assesses the general intelligence level of children between ages three and eight. It consists of tasks measuring verbal comprehension, perceptual organization and ability to manipulate increasingly complex symbols, spatial and numerical. Subjects respond to questions by pointing to pictorial symbols on cards.

Study:

An Evaluation of the Effectiveness of an Enriched Curriculum in Overcoming the Consequences of Environmental Deprivation.

- a. Sample: 1965-66 experimental and control subjects, Negro male and female children, nursery level, lower SES.
- b. Results: This test will be used as part of a battery of tests to evaluate the general intellectual level of these children.

## XI. NEW TEST SERIES IN EARLY DEVELOPMENTAL STAGES.

### A. Standard Telephone Interview.

This technique is presently being refined to obtain representative speech samples from children. The interview consists of 10 general questions designed to demonstrate the child's orientation to place and time, recall of immediate and past events, labeling ability, imagination in descriptive use of language, and ability to communicate these things verbally.

#### Study:

##### Development of a Standardized Telephone Interview for the measurement of Language Change in Young Children.

#### a. Sample:

a<sub>1</sub>) Pilot Sample: 42 Negro male and female children, kindergarteners (22 enrichment class children and 20 nonenrichment children).

b<sub>1</sub>) Results: (1) In the pilot study based on an interview consisting of six questions, three major language variables were studied: the imaginative use of language (the degree to which the child offered more than a routine, simplified factual response to the examiner's question); the functional use of language (a measure of the child's ability to communicate verbally with the examiner so that a listener was able to understand the child's responses with relative ease); and the structure of responses (the child's use of complete sentences and functionally complete units, as contrasted with one-word answers



and nonfunctional fragments). (2) Preliminary findings show that on a five-point scale there was a high interrater reliability on the three major language variables cited above. (3) The experimental (enriched) group consistently received a better rating on these language variables than the control group.

a<sub>2</sub>) Current Study Sample: 42 Negro male and female children, nursery school level, divided into three groups of 14 children each. Groups I and II received an initial telephone interview in October, 1964, a second interview in January, 1965, and will receive a final interview in June. Group III received an initial interview in December, 1964, and will receive a final interview in June, 1965. The following are the treatment conditions designed to determine the effect of telephone exposure in the classroom.

Group I: Enrichment children with telephone experience in the classroom throughout the school year

Group II: Enrichment children with telephone experience in the classroom during the last three months of the school year

Group III: Children in the regular Board of Education nursery class, P.S. 119, with no phone experience.

b<sub>2</sub>) Results: Based on the ongoing research, guidelines are being developed for programming the use of the telephone as a language enrichment technique for prekindergarten through first-grade enrichment classes.

B. Pupil Performance Inventories.

These inventories are Institute-designed multidimensional assessment techniques presently being devised to provide descriptions of children from lower socioeconomic backgrounds in terms of various abilities. Many of these inventories are curriculum-oriented in order to evaluate the child's change in performance and the effectiveness of the teacher and the curriculum.

The aim of the inventories is to assess the child's achievement in specific areas as he enters the enrichment program and, on a continuing basis, over time. The abilities to be evaluated are:

1. Language (structure and labeling)
2. Discrimination (auditory and visual)
3. General information
4. Conceptual abilities (relative and concrete)
5. Manipulative skills

Information gathered from these techniques will be used for predicting pupil's achievement in standardized measures of academic performance in their future school careers. In addition, this information will be related to concurrent measures of performance that are normally used as part of the enrichment program.

C. Alphabet Tests.

The alphabet tests are designed to measure specific alphabet knowledge, rather than general skills. The tests are in the process of development at the Institute and include tests of letter naming, letter matching, knowledge of the correct orientation of letters, and ability to generalize learning of a particular set of letters to letters of different styles and to letters of upper and lower case. The tests have been employed as pre-post measures in several studies using the alphabet board or the Edison Responsive Environment typewriter (often referred to as the "talking typewriter"). When standardization of the tests has been completed, they will be used, in addition to the Reading Prognosis Test, to evaluate a reading curriculum that will be developed using the typewriter.

1. The Letter Naming Test - This test will be the screening test used to identify those children who have no alphabet knowledge and who will subsequently be used in the experimental and control groups. It requires the child both to name letters when shown a card containing the entire alphabet, and to choose from groups of five letters the letter named by the experimenter.

2. The Scanning Test - This test requires the child to locate a particular letter within a matrix containing the entire alphabet, after he has been shown the particular letter. The time required for the child to make the response will be

recorded.

c. The Letter Generalization Test - This test requires the child to locate particular letters within a matrix; the response is timed. The individual letters and matrix letters vary in a number of ways: color, slant, line density, size, and irregularity due to being hand-printed rather than typed.

d. The Orientation Discrimination Test - This is a multiple-choice test in which each item requires the child to pick the correctly oriented letter from an array that contains all possible rotations and reversals of the letter, at 90-degree intervals.

Study:

a. Sample: 40 Negro boys and girls, nursery and kindergarten level, lower SES.

b. Results: These tests are being pilot tested and will be used in a study evaluating learning based on training techniques using an Alphabet Form Board.